ABSTRACT OF THE DISCLOSURE

The invention provides a lentiviral vector containing an attachment incompetent fusogenic polypeptide and a heterologous targeting polypeptide. Also provided is a lentiviral packaging construct. The construct contains a nucleic acid encoding trans-acting factors sufficient for lentiviral vector generation and an attachment incompetent fusogenic polypeptide. A lentiviral packaging system having at least two nucleic acid vectors is further provided. The lentiviral packaging system consists of a first nucleic acid vector comprising a packaging construct encoding a trans-acting factor for lentiviral vector generation, and a second nucleic acid vector encoding an attachment incompetent fusogenic polypeptide, said at least two vectors together encoding trans-acting factors sufficient for lentiviral vector generation. The invention additionally provides a lentiviral gene delivery system having at least three nucleic acid vectors. The gene delivery system consists of: a first nucleic acid vector comprising a packaging construct encoding a trans-acting factor for lentiviral vector generation; a second nucleic acid vector comprising a fusogenic construct encoding an attachment incompetent fusogenic polypeptide, and a third nucleic acid vector comprising a lentiviral vector genome encoding lentiviral cis sequences sufficient for vector genome transduction, said at least three vectors together encoding trans-acting factors sufficient for lentiviral vector generation. Finally, methods of transducing a cell and methods of targeting a gene to a cell or tissue using the lentiviral vectors and systems of the invention are also provided.